

Pesticide Container Disposal

ABOUT A YEAR AGO when the noose began to tighten around DDT, one industry spokesman mused: "If there's a residue problem, the worst one will come with a ban of DDT . . . when all the people that have some on the shelf dump it down the drain."

If a pinch of sarcasm is noted perhaps it's justified. Behind every major instance of pesticide damage, there has been ample evidence that the chemical was not used according to label instructions. It would appear logical, therefore, that the least-risk method would be to use the product as recommended until it was gone.

Unfortunately, human nature prescribes quick disposal of a hot potato rather than careful handling until it cools off.

"You can't be too careful with some things," folks say, and chemicals are one of "them things." This feeling is a contributing reason for the FDA and USDA requirement that a chemical must have a 100-fold safety margin built in for the user and consumer. It's a strong building block in the sensitivity that has risen over pesticide container disposal.

Most certainly, containers should be disposed of carefully to avoid the risk of improper dosages at improper places.

Quite a bit of information is available, but research is continual. USDA bulletin 750 is helpful, however a department spokesman said new information was about ready to be released.

Disposal Methods

Disposal methods can be summed up as three: burying, chemical decontamination, and thermal degradation. Burning is regarded the safest.

G. T. Fisher, entomologist at the University of New Hampshire, published these recommendations in February:

1. Container disposal — combustible bags, fiber drums, cardboard and wooden boxes. (a) Burn at public incinerator (must be capable of 900-1200 degrees Fahrenheit) except weed killer containers. Bury these. (b) Dump with prior permission of dump supervisor. (c) Bury on a flat-level area, away from water sources, at least 18 inches deep, and cover with soil. Crush containers. (Par. c sums up recommendation for disposing of DDT).

2. Container disposal — non-combustible metal cans, drums and glass containers. To decontaminate containers (5-30-55-gal. drums) carefully wash and rinse on the outside, then decontaminate chemically by alkaline decomposition of the residual pesticide by the following steps:

a. Drain container as completely as possible in the cleaning or burial area.

b. Carefully add water, detergent and caustic soda according to quantities needed (see Table I).

c. Close containers and rotate carefully to wet all inner surfaces with caustic solution. Let stand for at least 15 minutes, with occasional agitation. Prolonging the contact of the caustic solution improves decontamination.

d. Remove all bungs and closures and drain solution into the burial pit.

e. Rinse container inside and out and dispose of rinse in the burial pit.

If a pesticide container is to be burned by a commercial incinerator, the operator should be instructed in the complete nature of the material contained, Fisher cautioned.

Pesticide Incineration

Research on chemical and thermal methods for disposal of pesticides has been under way at Mississippi State University for several years. A report in Residue Reviews in 1969



... a Look at Burning

states that while several disposal methods have been investigated, "none has proved to be ideal procedure, although some have varying degrees of merit."

The widely circulated recommendation of burying, for example, means the site is rendered useless for a number of other purposes "for any time in the foreseeable future."

The paper, by M. V. Kennedy, B. J. Stojanovic and F. L. Shuman, Jr., does conclude that "incineration is superior to chemical methods for the destruction of waste pesticide chemicals."

Simple incineration, however, is not sufficient, cautions Stojanovic. Incinerators should have the capability of recirculating and reburning flue gases. Otherwise, the escaping gases "would present a definite threat from the standpoint of air pollution. Also, it would endanger humans, animals, and vegetation for some distance around the incineration site upon combustion of certain pesticides."

The Mississippi study investigated the thermal degradation for 20 pesticide chemicals: 2,4-D (2 lb./gal. "formula 40"), Picloram (11.6% solution), Atrazine (80WP), Diuron (80WP), Trifluralin (4 lb./gal. — liquid), Bromacil (80WP), DSMA (3.2 lb. gal.) DNBP (3 lb./gal. "pre-merge"), Dicamba (4 lb./gal.), Dalapon (85WP), Paraquat (2 lb./gal.), Vernolate (6 lb./gal., liquid), 2,4,5-T (4 lb./gal.; 44.1% acid equivalent), Carbaryl (10% dust), DDT (technical flakes), Dieldrin (17.8% solution), Malathion (5 lb./gal.; 57% solution), PMA (Mersoite -88W; 95% water dispersable), Zineb ("Parazate" -C; 75WP), and Nemagon (8.6 lb./gal.).

A differential thermal analysis was conducted in which complete combustion was determined for a reference standard for the pesticide material and also for the commercial formulation.

The study showed that "complete incineration temperatures of the reagent-grade pesticides ranged from about 250 degrees Centigrade to about 850 degrees C.; 15 of the compounds were completely combustible at 700 degrees C. or below, while five required 700 degrees and 900 degrees C.

Under similar conditions, the commercial formulations required essen-

tially the same temperature ranges (See Table 2); dalapon, trifluralin, and nemagon required higher temperatures than the respective reagent-grade compounds. All but six formulations approached complete combustion at 800 degrees C. Atrazine, carbaryl, bromacil, and dalapon contained about 10% of uncombustible residue at 1,000 degrees C., whereas DSMA and zineb yielded

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TABLE 1. CAUSTIC RINSE SOLUTION FOR ORGANIC PHOSPHATE CONTAINERS

Container Size	Water	Detergent	Caustic Soda (lye)
Less than 5-gallons	1 pint	1 tablespoon	1-2 tablespoons
5-gallons	2 quarts	2 tablespoons	½ cup
15-gallons	1½ gallons	¼ cup	½ pound
30-gallons	3 gallons	½ cup	1 pound
55-gallons	5 gallons	1 cup	2 pounds

TABLE 2. Percent loss on combustion of commercial formulations of pesticides at five temperatures.

Commercial formulation	Loss (%) at				
	600° C.	700° C.	800° C.	900° C.	1000° C.
Picloram	90.8	91.8	95.6	98.7	99.2
Atrazine	87.8	88.1	88.8	88.9	89.0
Nemagon	99.6	99.6	99.6	99.6	99.6
Trifluralin	99.7	99.8	99.8	99.8	99.8
Malathion	95.3	96.0	96.3	96.4	96.7
2,4,5-T	99.9	99.9	99.9	99.9	99.9
Zineb	70.1	71.3	71.5	72.7	72.8
Vernam	99.6	99.6	99.6	99.6	99.6
Paraquat	98.3	98.6	99.0	100.0	100.0
Dicamba	98.6	98.7	98.9	99.0	99.4
Bromacil	88.8	89.1	89.4	90.5	91.3
Dieldrin	99.1	99.4	99.5	99.5	99.5
DDT	99.2	99.3	99.7	99.9	100.0
Dalapon	64.3	64.3	67.8	73.8	91.0
2,4-D	99.8	99.9	99.9	99.9	99.9
Diuron	94.6	95.0	95.4	95.5	95.7
DNBP	99.8	99.8	99.8	99.8	99.8
DSMA	80.6	80.7	80.7	81.2	81.2
Sevin	88.7	88.8	88.8	89.1	89.5

TABLE 3. National Barrel and Drum Association firms having burning equipment.

Apex Drum Co. 6226 Ferguson Drive Commerce, Calif. 90640	Skolnik Drum Corp. 4601 West 48th Street Chicago, Ill. 60632	Midwest Barrel & Drum Co. 807 Farrington Avenue St. Paul, Minn. 55117	Standard Pail & Drum 8110 Preble Avenue Cleveland, Ohio 44104
Myers Drum Co. 6549 San Pablo Avenue Oakland, Calif. 94608 and 5400 South Soto Los Angeles, Calif. 90058	Sterling Drum Co. 610 West 81st Street Chicago, Ill. 60620	Northwestern Cooperage 42 Ferry Street St. Louis, Mo. 63160	Columbus Steel Drum 2829 East 4th Avenue Columbus, Ohio 43219
A. Rooke Cooperage Co. 7702 Maie Avenue Los Angeles, Calif. 90001	Des Moines Barrel & Drum S.E. 19th at Scott Street Des Moines, Iowa 50316	Conway Barrel & Drum Route 125 Haverhill Road Kingston, N. H. 03865	Lammers Barrel Corp. Radio Rd., P.O. Box 3087 Overlook Station Dayton, Ohio 43219
Ted Levine Cooperate 9629 El Poche Street South El Monte, Calif. 91733	Sims Barrel Co. 1161 So. 12th Street Kansas City, Kans. 66105	Bayonne Barrel & Drum Raymond Boulevard & Route 1 Newark, N.J. 07105	Reimann & McKenney 3000 N.W. St. Helens Road Portland, Ore. 97210
S. Rose Cooperage 1051 Union Street Montebello, Calif. 90640	Allied Drum Service, Inc. 401 Colorado Avenue P.O. Box 8055 Sta. E. Louisville, Ky. 40208	Gold Cooperage 401 South Street Newark, N.J. 07105	General Cooperage Co. 2435 Island Road Philadelphia, Penna. 19142
Lorentz Barrel & Drum 1515 South 10th Street San Jose, Calif. 95112	Export Drum Co. 7627 Scenic Highway Baton Rouge, La. 70807	Acme Steel Drum Co. 1050 Grand Street Brooklyn, N.Y. 11211	National Steel Drum Ontario & Trenton Philadelphia, Penna. 19134
Kaminsky Barrel 2200 Blake Street Denver, Colo. 80205	Geo. P. Garratt Sons & Co. 2815 Waterview Avenue Baltimore, Md. 21230	H. Hyman Drum & Barrel 878 South Division Street Buffalo, N.Y. 14210	Southwark Cooperage Meadow & Wolf Streets Philadelphia, Penna. 19148
Drum Service Co. of Fla. 803 Jones Avenue P.O. Box 278 Zellwood, Fla. 32798	H. F. Clark & Sons 236 Third Street Chelsea, Mass.	Active Steel Drum 52-30 34th Street Long Island City, N.Y. 11101	New England Container 2072 Smith Street Centredale, R.I. 02911
Atlanta Cooperage 647 Bankhead Avenue Atlanta, Ga. 30318	Ryan Barrel Co. 56 Pulaski Street Peabody, Mass. 01960	Academy Steel Drum P.O. Box 455 Charlotte, N.C. 28201	D. F. Farrell Sons Box 286 Coventry, R.I. 02816
J & B Smith Co. P.O. Box 10504 Station A. Atlanta, Ga. 30318	Acme Service & Cont. 12800 Eaton Avenue Detroit, Mich. 48228	Acme Barrel & Drum 16 - 38 DeCamp Avenue Cincinnati, Ohio 45216	Moore Drums, Inc. Stark Industrial Park Charleston Heights, S.C. 29405
Georgia Steel Drum Box 575 Austell, Ga. 30001	American Renovating 9201 Freeland Avenue Detroit, Michigan 48228	Alex Gottlieb Container 6401 Wiehe Road Cincinnati, Ohio 45237	Dallas Steel Drums 2215 North Beckley Dallas, Texas 75208
Alsip Barrel & Drum Co., Inc. 4100 W. 123rd Street Alsip, Ill. 60658	Atlas Gottlieb Co. 1505 East Ferry Avenue Detroit, Michigan 48211	Advance Barrel & Drum 6830 Beaver Avenue Cleveland, Ohio 44104	Drum Service Co. P.O. Box 15337 Houston, Texas 77020
Acme Barrel Co. 2300 West 13th Chicago, Ill. 60608	Michigan Drum Renovating Co. 24800 Schoenherr Road Warren, Mich. 48089	Amity Drum 101 E. Amity Road Cincinnati, Ohio 45237	Port Drum Co. 237 West 9th Street Port Arthur, Texas 77641
American Steel Cont. 4445 West 5th Avenue Chicago, Ill. 60624	Dworsky Barrel Co. 260 12th Street Minneapolis, Minn. 55401	Queen City Barrel & Drum 1937 South Street Cincinnati, Ohio 44404	Northwest Cooperage 7152 First Avenue South Seattle, Wash. 98108
E. Hansen Co., Inc. 2703 South Loomis Street Chicago, Ill. 60608	Minnesota Barrel & Drum 763 North 3rd Street Minneapolis, Minn. 55401	General Steel Barrel 3967 Pearl Road Cleveland, Ohio 44109	Atlas Steel Drum P.O. Box 187 Nitro, W. Va. 25143
	Industrial Steel Cont. 293 Commercial Street St. Paul, Minn. 55106		Kitzinger Cooperage 2529 East Norwich Street Milwaukee, Wisc. 53207

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19% and 23% ash, respectively, at 1,000 degrees C."

Work is continuing at MSU, Stojanovic said, to determine how the most efficient incinerator can be constructed.

Drum Reconditioning

In view of the research data showing that burning is the best method

to dispose of waste pesticides, the National Agricultural Chemicals Association has conducted a survey of members of the National Barrel and Drum Association who have burning equipment. (Table 3).

Large pesticide users stand to gain two benefits by choosing the burning method of disposal: getting rid of their containers and being reimbursed, to a small extent, for the cost of the container. Drum reconditioning firms pay from 50 cents to

\$2.00 for metal drums, depending on size (30 or 55 gal.) and condition.

These firms clean the drums thermally and/or chemically, strip them to bare metal (by blasting them with steel particles for example), reshape, repaint and then sell them for the same or different use.

Manufacturers selling products in drums can realize considerable saving by utilizing reconditioned drums. The practice is common in the petroleum industry.